

REMARKS

Claims 4, 5, 11 and 12 have been amended, without the intention of changing the scope of the claimed invention. Claims 25 and 26 are newly added. Support for the amendment may be found throughout Applicant's originally filed specification. No new matter has been added. Accordingly, claims 1-26 are currently pending.

Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Claims 1-24 were rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the enablement requirement. Applicant traverses this rejection for at least the following reasons.

With respect to claims 1, 8, 18 and 19, the Office Action asserts "it is not clear how the material is manufactured at a temperature such that the temperature at which CTE crosses zero is between the manufacturing temperature and the mean operating temperature." [Office Action, page 2]. Further, the Office Action submits that the manufacturing temperature must be "...significantly higher than 26 degree (sic) Celsius. [*Id.* at pages 2-3]. Applicant disagrees with both assertions.

First, Applicant submits that the component and the material that the component is comprised of may each be manufactured by materially different processes and temperatures. As described in the specification, the manufacturing temperature of the component is not the hot forming temperature of the base ceramic material, as apparently assumed by the Office Action. Instead, the "manufacturing temperature" is the temperature at which the ceramic is machined into a finished component.

It should be appreciated that high-precision optical elements such as are used in lithography apparatus are normally ground to their final configuration while being maintained at a very constant temperature. However, in the event that manufacturing processes occur at different temperatures *it is the temperature of the final polishing and figure checking process that is relevant as the manufacturing temperature* for the purposes of the present invention.

[Applicant's specification, paragraph [0038], emphasis added]. Therefore, the manufacturing temperature of the component need not be such that the raw materials are molten, refined, homogenized or hot formed, as discussed by the Office Action. Rather, in one embodiment, the manufacturing temperature of the component may be 22 degrees Celsius.

[Applicant's specification, paragraph [0033]]. As such, Applicant submits that specification provides sufficient disclosure with regard to determining the temperature at which the component is manufactured (i.e., the second temperature). Moreover, new claims 25 and 26 recite that the second temperature is a temperature of a final polishing and figure-checking step of the component.

In addition, the Office Action asserts that "[t]he mean operating temperature must be higher than room temperature since in a lithographic apparatus the illumination beam would heat the optical device to a temperature higher than room temperature." [Office Action, page 2, emphasis added]. Applicant disagrees.

For example, Applicant submits that it is generally known in the lithography art that components of a lithographic apparatus may be selectively controlled to prevent overheating due latent heat generated by the illumination beam. As such, the mean opening temperature of the lithography apparatus need not necessary be above room temperature, as apparently assumed by the Office Action.

Accordingly, Applicant submits that a case of non-enablement has not been shown and requests that the rejections of claims 1-24 under 35 U.S.C. § 112, first paragraph, should be withdrawn and the claims be allowed.

Claims 4, 5, 11 and 12 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to point out and distinctively claim the subject matter which applicant regards as the invention. Applicant traverses this rejection for at least the following reasons.

In particular, the Office Action maintains with regard to claim 4 and 11, that "the term 'low' is unclear because it is a relative term, and without a standard to which to compare, the term 'low' is meaningless. Further, since the coefficient can have negative and positive values it is not clear whether the value has a low absolute value or if the value has a negative value." [Office Action, page 2]. Additionally, the Office Action maintains with respect to claims 5 and 12, that "it is not clear with respect to which temperature the coefficient is low or has a substantially zero coefficient." [*Id.*]. Applicant disagrees with these assertions.

However, solely in an effort to expedite prosecution, Applicant has amended claims 4 and 11 to recite that "the selected material is a material having a low magnitude coefficient of thermal expansion is at the mean operating temperature," and has amended claims 5 and 12 to

recite that “the selected material is a material having a substantially zero coefficient of thermal expansion is at the mean operating temperature.”

In addition, MPEP § 2173.05 (b) provides:

The fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph. *Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.

Moreover, “[w]hen a term of degree is presented in a claim, first a determination is to be made as to whether the specification provides some standard for measuring that degree.” [*Id.*] Applicant submits that the limitations of claims 4 and 11 reciting “...a material having a low magnitude coefficient of thermal expansion at the mean operating temperature,” and the limitations of claims 5 and 12 reciting “...a material having a substantially zero coefficient of thermal expansion at the mean operating temperature,” are definite in light of Applicant’s specification. For example, paragraph [0030] of Applicant’s originally-filed specification discloses that the material may be, e.g., a ZERODUR<sup>TM</sup> glass ceramic or ULE<sup>TM</sup> glass. Indeed, both of these materials have very low coefficients of thermal expansion, of which the magnitude is substantially zero. Further, both materials are known in the art as being low CTE materials, irregardless of whether the CTE has a positive or negative value. Rather, it is the magnitude (absolute value) of the CTE which is significant in selecting a particular material. [*See, e.g., Claims 21 and 23, supra.*] Indeed, whether the CTE is positive or negative will depend on the current temperature of the material.

Accordingly, in light of the amendment and clarification above, Applicant submits that the claims are definite and respectfully requests that the rejections of claims 4, 5, 11 and 12 under 35 U.S.C. § 112, second paragraph, should be withdrawn and the claims be allowed.

Claims 1, 4, 5, 8, 11, 12 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0064655 to Morin, SR. et al. (“Morin”) in view of U.S. Patent Application Publication No. 2002/0075466 to Gruner et al. (“Gruner”). Applicant traverses this rejection for at least the following reasons.

First, Applicant submits that Morin is non-analogous prior art as it is not in Applicant’s field of endeavor, nor is it reasonably pertinent to the particular problems with which Applicant faced. *See* MPEP § 2141.01(a). For example, Morin concerns a brass plated carbon fiber

reinforced rubber, for use in automotive products, such as steel radial tires, belts and hoses. [See Morin, paragraphs [0002-0003]]. Applicant submits that reinforced rubber is none at all similar to lithography and thus, is not a reference that "logically would have commended itself to an inventor's attention in considering his problem." See *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992).

Second, even assuming *arguendo* that Morin may be properly relied upon (which Applicant does not concede for at least the reasons discussed above), Applicant submits that the cited portions of Morin fail to disclose or render obvious a method of manufacturing a component that will, in use, experience a thermal load and will be operated at a mean operating temperature, the method comprising, *inter alia*, selecting a material having a coefficient of thermal expansion having a zero-crossing at a first temperature; manufacturing the component using the selected material at a second temperature, wherein the first temperature is between the second temperature and the mean operating temperature, so as to minimize deformation of the component at the mean operating temperature, as recited in claim 1. Similarly, Applicant submits that the cited portions of Morin fail to disclose or render obvious a component for use in a lithographic apparatus, the apparatus being configured to project a patterned beam of radiation onto a target portion of a substrate, wherein the component is made of a material having a coefficient of thermal expansion having a zero-crossing at a first temperature between a second temperature at which the component is manufactured and a mean operating temperature of the component, as recited in claim 8.

For example, as acknowledged by the Office Action, "... Morin does not explicitly disclose that the temperature at which the coefficient of thermal expansion is between the manufacturing temperature and the means operating temperature ..." However, the Office Action concludes that:

...it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a method or a component in which the coefficient of thermal expansion has a zero-crossing at a first temperature, the manufacturing the component at a second temperature and the first temperature is between the second temperature and the mean operating temperature ***because the component is manufactured at a temperature, and the mean operating temperature depends on the operation in which the component is used,*** and with the two temperatures provided, it would be routine skill as taught by Morin to tailor the zero-crossing of the coefficient of thermal expansion to fall between the two temperatures.

[Office Action, page 4, emphasis added]. Applicant disagrees.

First, Applicant submits that the manufacturing temperature of the component (i.e. the second temperature) and the mean operating temperature and not merely arbitrary (or coincidental) values. For example, the manufacturing temperature and/or the mean operating temperature are purposely selected such that the zero-crossing temperature of the material is between the two temperatures. [See, e.g., Applicant's specification, paragraphs [0030-0032]]. As discussed above, one or both of the second temperature and the mean operating temperature may be selectively controlled.

By contrast, the cited portions of Morin disclose a reinforced material for use in belt application having a tailored coefficient of thermal expansion which may be negative, zero or positive. [See Morin, paragraph [0005]]. Further, the cited portions of Morin disclose that the coefficient of thermal expansion may be tailored *as a function of the deposition of brass onto the fibers*. [See Morin, paragraph [0011]]. However, the cited portions of Morin make no mention or suggestion of manufacturing the component using the selected material at a second temperature, wherein the first temperature is between the second temperature and the mean operating temperature, so as to minimize deformation of the component at the mean operating temperature. Indeed, as acknowledged by the Office Action, "Morin does not disclose the mean operating temperature of the material." [Office Action, page 4]. Moreover, Applicant submits that the cited portions of Morin are silent as to a zero-crossing temperature of the material and a manufacturing temperature of the component.

Further, Applicant submits that the cited portions of Gruner do not overcome the shortcomings of Morin. Even assuming, *arguendo*, that Gruner is properly combinable with Morin (which Applicant does not concede for at least the reasons discussed above), the cited portions of Gruner make no mention or suggestion of a zero-crossing temperature of the material, a manufacturing temperature of the component, or a mean operating temperature component, much less manufacturing the component using the selected material at a second temperature, wherein the first temperature is between the second temperature and the mean operating temperature, so as to minimize deformation of the component at the mean operating temperature.

For example, the cited portions of Gruner discloses selecting a material, for example, Zerodur® glass, in one of a mirror 12 and at least one lens 8, 9 to counteract imaging and

dimensional changes therebetween. [Gruner, paragraphs [0023-0024] and Abstract]. By contrast, Applicant seeks to minimize deformation of the component at the mean operating temperature altogether. [See, e.g., Applicant's specification, paragraph [0011]].

Accordingly, Applicant submits that a *prima facie* case of obviousness has not been established and that the cited portions of Morin, Gruner, or a proper combination thereof fail to disclose or render obvious each and every element recited by claims 1 and 8. Claims 4, 5, 11, 12 and 20 depend from claims 1 and 8, respectively, and are patentable for at least the same reasons provided above related to claims 1 and 8 and for the additional features recited therein. Thus, Applicant respectfully requests that the rejections of claims 1, 4, 5, 8, 11, 12 and 20 under 35 U.S.C. § 103(a) over Morin in view of Gruner should be withdrawn and the claims be allowed.

New claims 25-26 depend from claims 1 and 8, respectively, are patentable for at least the same reasons provided above related to claims 1 and 8 and for the additional features recited therein. Thus, Applicant respectfully requests that claims 25-26 be allowed.

In view of the above, Applicant respectfully submits that all the claims are allowable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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